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EXAMINER

WYATT, KEVIN S

ART UNIT PAPER NUMBER

2878

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/771,789

Applicant(s)

ITO, DAISUKE

Examiner

Kevin Wyatt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6,8-10,12-14,16 and 18 is/are rejected.
- 7) ☒ Claim(s) 3,7,11,15 and 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/03/2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 19, line 15, "angel" should be changed to --angle--.

Appropriate correction is required.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

3. Claims 1,17-18 are objected to because of the following informalities:

In claim 1, line 4, "first lens element" should be changed to --first lens unit--.

In claim 1, line 8, "second lens element" should be changed to
--second lens unit--.

In claim 17, line 4, "first lens element" should be changed to --first lens unit--.

In claim 17, line 8, "second lens element" should be changed to
--second lens unit--.

In claim 18, line 4, "first lens element" should be changed to --first lens unit--.

In claim 18, line 8, "second lens element" should be changed to
--second lens unit--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 4, 9-10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Hata (U.S. Patent No. 4,993,814).

Regarding claim 1, Hata shows in Figs. 8-9, a lens system comprising: in order from the front to the rear, a first lens unit (I) having a negative optical power, the first lens element consisting of a lens element (L1) whose rear surface has a concave shape; an aperture stop (3); and a second lens unit (II) having a positive optical power, the second lens element comprising three lens elements (L2, L3, and L4), wherein the following condition is satisfied: $0.7 < td/f < 1.3$ (i.e., according to tables 17-18, $(td = d_1 + d_2 + \dots + d_9)$, thus $td_{table\ 17} = 21.95$, $td_{table\ 18} = 22.02$ respectively, and given $f = 23.0$, $td/f_{table\ 17} = 0.95$, and $td/f_{table\ 18} = 0.95$, therefore the ratio of system lens length to focal length provided by Hata meets the above conditions) where td denotes a length of the entire lens system, and f denotes a focal length of the entire lens system (see tables 17-18).

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Regarding claims 2 and 10, Hata shows in Figs. 8-9, a lens system wherein the following conditions are satisfied: $0.8 < |f_1|/f < 2.5$, $0.1 < d_2/f < 0.8$, where f_1 denotes a focal length of the first lens unit, and d_2 denotes an interval from a rearmost surface of the first lens unit to a foremost surface of the second lens unit (see calculations below).

Calculations

$$P = \frac{n - n_o}{R} \quad \text{Eq [2-5] p. 31}$$

from table 17:

$$\text{thus, } P_1 = \frac{n - n_o}{R_1} \quad \text{and} \quad P_2 = \frac{n - n_o}{R_2}$$

$$n = 1.59$$

$$n_o = 1.00$$

$$R_1 = 54.23$$

$$R_2 = 12.70$$

$$d = 1.60$$

$$f = 17.0$$

$$d_2 = 1.00$$

$$d_3 = 1.00$$

$$P_{eq} = \frac{P_1}{1 - P_1(d/n)} + P_2 \quad \text{Eq [3-12] p. 59}$$

$$= \frac{\frac{1.59 - 1.00}{54.23}}{1 - \frac{1.59 - 1.00}{54.23} \cdot \frac{1.60}{1.59}} + \frac{1.59 - 1.00}{12.70}$$

$$= \frac{0.0108}{1 - 0.0108 \cdot 1.0063} + 0.0464$$

$$= 0.057 \quad f_{eq} = \frac{1}{P_{eq}} = 17.40$$

$$\text{where } f_{eq} = f_1$$

$$\text{thus, } 0.8 < 17.40/17.0 < 2.5$$

$$0.8 < 1.02 < 2.5$$

and

$$0.1 < (3.00 + 1.10)/17.0 < 0.8$$

$$0.1 < 0.24 < 0.8$$

Therefore the following conditions are satisfied:

$$0.8 < |f_1|/f < 2.5$$

$$0.1 < d_2/f < 0.8$$

Regarding claims 4 and 12, Hata shows in Figs. 8-9 that the second lens unit has one or more aspherical surfaces.

Regarding claim 9, Hata shows in Figs. 8-9 a lens system comprising: in order from the front to the rear, a first lens element (L_1) having a meniscus shape whose concave surface is directed rearward and having a negative optical power (i.e., negative lens element (L_1) whose image side surface has a stronger refractive power than its object side surface, col. 11, lines 17-18); an aperture stop (3, i.e., aperture diaphragm, col. 16, lines 5-6); a second lens element (L_2) whose both lens surfaces have a convex shape; a third lens element (L_3) whose both lens surfaces have a concave shape; and a fourth lens element (L_4) whose rear surface has a convex shape and having a positive optical power, wherein lens elements included in the lens system are only the first to fourth lens elements.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 5-6, 13-14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata (U.S. Patent No. 4,993,814) in view of Raynor (Publication No. U.S. 2002/0079491 A1).

Regarding claims 5 and 13, Hata discloses the claimed invention as stated above. Hata does not disclose that the lens system forms an image on a photosensitive surface of a photoelectric conversion element. Raynor shows in Figs. 6-8 a solid state

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image sensor comprising a microlens array. It would have been obvious to one skilled in the art to provide the image sensor of Raynor to the device of Hata for the purpose of capturing an image formed at the end of a lens system resulting in a digital signal.

Regarding claims 6 and 14, Hata discloses the claimed invention as stated above. Hata does not disclose that a photoelectric conversion element which receives light of an image formed by the lens system. Raynor shows in Figs. 6-8 a solid state image sensor comprising a microlens array. It would have been obvious to one skilled in the art to provide the image sensor of Raynor to the device of Hata for the purpose of capturing an image formed at the end of a lens system resulting in a digital signal.

Regarding claim 18, Hata discloses the claimed invention as stated above. Hata does not disclose an image-taking apparatus with a lens system comprising: a photoelectric conversion element which receives light of an image formed by the lens system, wherein the following condition is satisfied: $15^{\circ} < \theta < 25^{\circ}$ where θ denotes an angle formed by an off-axis principal ray which are directed from a rearmost surface of the second lens unit to a maximum image height on a photosensitive surface of the photoelectric conversion element and an axis principal ray. It would have been obvious to one skilled in the art to provide the image sensor of Raynor to the device of Hata for the purpose of capturing an image formed at the end of a lens system resulting in a digital signal. In addition, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have also been obvious to one skilled in the art to provide

a lens system that directs light rays in the desired angular range for the purpose of providing desired image detection and improved performance.

8. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hata (U.S. Patent No. 4,993,814).

Regarding claims 8 and 16, Hata discloses the claimed invention as stated above. Hata does not disclose an image-taking apparatus wherein the following condition is satisfied: $15^{\circ} < \theta_a < 25^{\circ}$ where θ_a denotes an angle formed by an off-axis principal ray which are directed from a rear surface of fourth lens element to a maximum image height a photosensitive surface of the photoelectric conversion element and an on-axis principal ray. It has been held that where the general conditions of a claim are discloses in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one skilled in the art to provide a lens system that directs light rays in the desired angular range for the purpose of providing desired image detection and improved performance.

Allowable Subject Matter

9. Claims 3,7,11 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 3 and 11, the prior art fails to disclose or make

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obvious, either singly or in combination, a lens system, comprising, in addition to the other recited features of the claim, a lens element which satisfies the following condition: $n > 2.0$ where n denotes a refractive index of the material of the lens element.

Regarding claim 7, the prior art fails to disclose or make obvious, either singly or in combination, an image-taking apparatus comprising, in addition to the other recited features of the claim, a lens system wherein the following condition is satisfied:

$0.19 < (\tan \omega - \phi/2f)/(1 - ok/f) < 0.37$ where ϕ denotes an effective diameter of a rearmost surface of the second lens unit, ω denotes a half-field angle of the entire lens system determined by an effective region of the photosensitive surface of the photoelectric conversion element, and ok denotes a distance from a rearmost surface of the entire lens system to a position of a rear principal point of the entire lens system.

Regarding claim 15, the prior art fails to disclose or make obvious, either singly or in combination, an image-taking apparatus, comprising, in addition to the other recited features of the claim, wherein the following condition is satisfied:

$0.19 < (\tan \omega_a - \phi_a/2f)/(1 - oka/f) < 0.37$ where ϕ_a denotes an effective diameter of a rear surface of the fourth lens element, ω_a denotes a half-field angle of the entire lens system determined by an effective region of a photosensitive surface of the photoelectric conversion element, and oka denotes a distance from a rearmost surface of the entire lens system to a position of a rear principal point of the entire lens system.

11. Claim 17 is allowed if claim overcomes claim objections.

12. The following is an examiner's statement of reasons for allowance.

Claim 17 is allowed because the prior art fails to disclose or make obvious, either singly or in combination, an image-taking apparatus, comprising, in addition to the other recited features of the claim, a lens system, wherein the following condition is satisfied: $0.19 < (\tan \omega - \phi/2f)/(1 - ok/f) < 0.37$ where ϕ denotes an effective diameter of a rearmost surface of the second lens unit, ω denotes a half-field angle the entire lens system determined by an effective region of a photosensitive surface of the photoelectric conversion element, and denotes a distance from a rearmost surface of the entire lens system to a position of a rear principal point of the entire lens system.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hirakawa (U.S. Patent No. 5,233,474) discloses a wide-angle lens system.

Ogasawara (U.S. Patent No. 5,619,380) discloses an objective optical system for endoscopes.

Doh (U.S. Patent No. 5,812,327) discloses an imaging lens.

Nakabayashi (U.S. Patent No. 6,018,425) discloses a wide-angle lens assembly and method.

Nanba (U.S. Patent No. 6,236,521 B1) discloses an objective lens and image

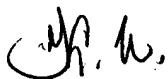
pickup device using the same.

Nagaoka (U.S. Patent No. 6,243,217 B1) discloses an objective lens system.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Wyatt whose telephone number is (571)-272-5974. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571)-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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